Designing, Developing, and Deploying Information Appliances



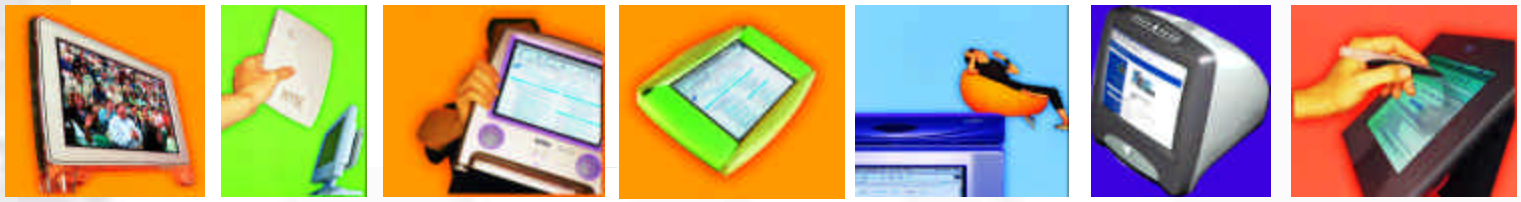




Home Clients Go to Market



Malcolm Humphrey
Business Unit Director
Information Appliance Division
National Semiconductor Corporation



San Jose January 23-24, 2001 • Taipei February 14-15, 2001

What is an Information Appliance?

- **Consumer**
 - Any non-PC device that delivers all or some portion of its benefits via a connection to the Internet
- **Commercial**
 - Thin clients, Windows-based terminals
 - POS
 - Appliance servers
- **Form-factor**
 - Wired or wireless
 - CRT, LCD, or TV display

Information Appliance vs. the PC

- **PC Selection criteria**
 - MHz
 - Price
 - What's "Inside"
- **IA Selection criteria**
 - What does it do? Does it do it well?
 - Is it "compatible" with the web?
 Can it run web-based applications?
 - Communications and Display
 - Size and power - Where will I put it?
 - Price

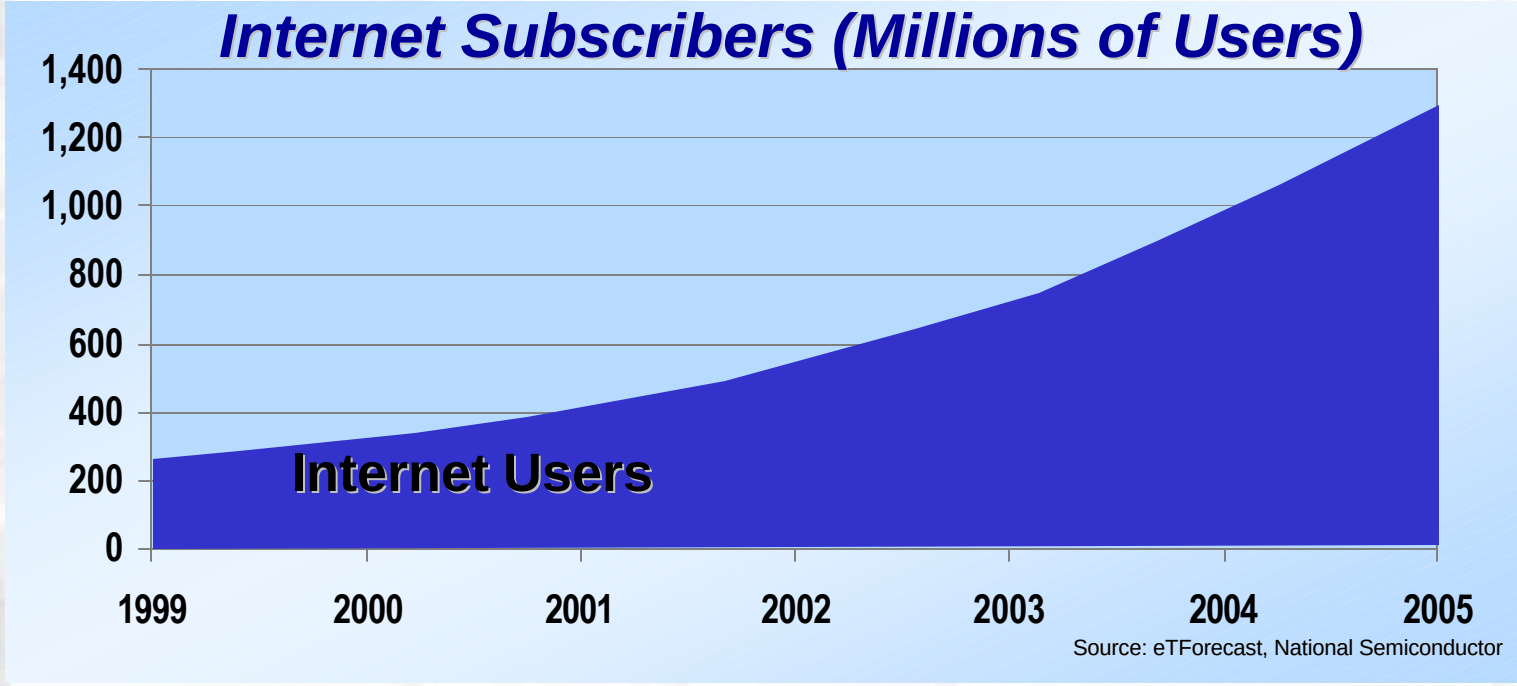
Consumers Want Products That Are:

- Simple, easy to use
- Connected to the information THEY WANT
- No boot up…always on 24/7
- Portable, small, low power
- Simplify their lives not complicate it

The Product Isn't Just The Box

- The display is the product
- Connectivity is the product
- Content is the product
- Services are the product
- Productivity is the product
- The *user-experience* is the product

Internet Subscribers Soaring at 118% Per Year!

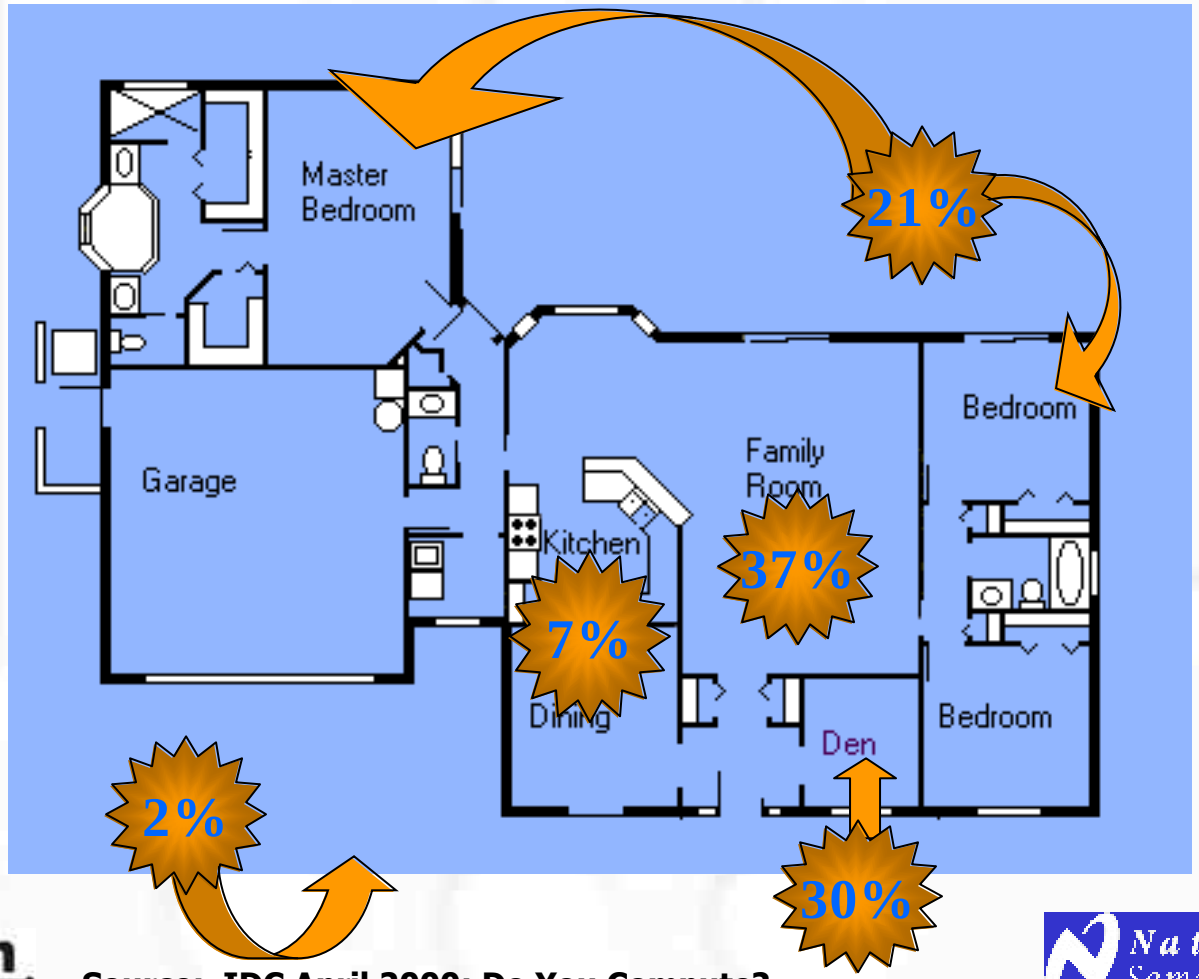


The credit to date goes to ...the PC!

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Internet Access Points: The PC Era

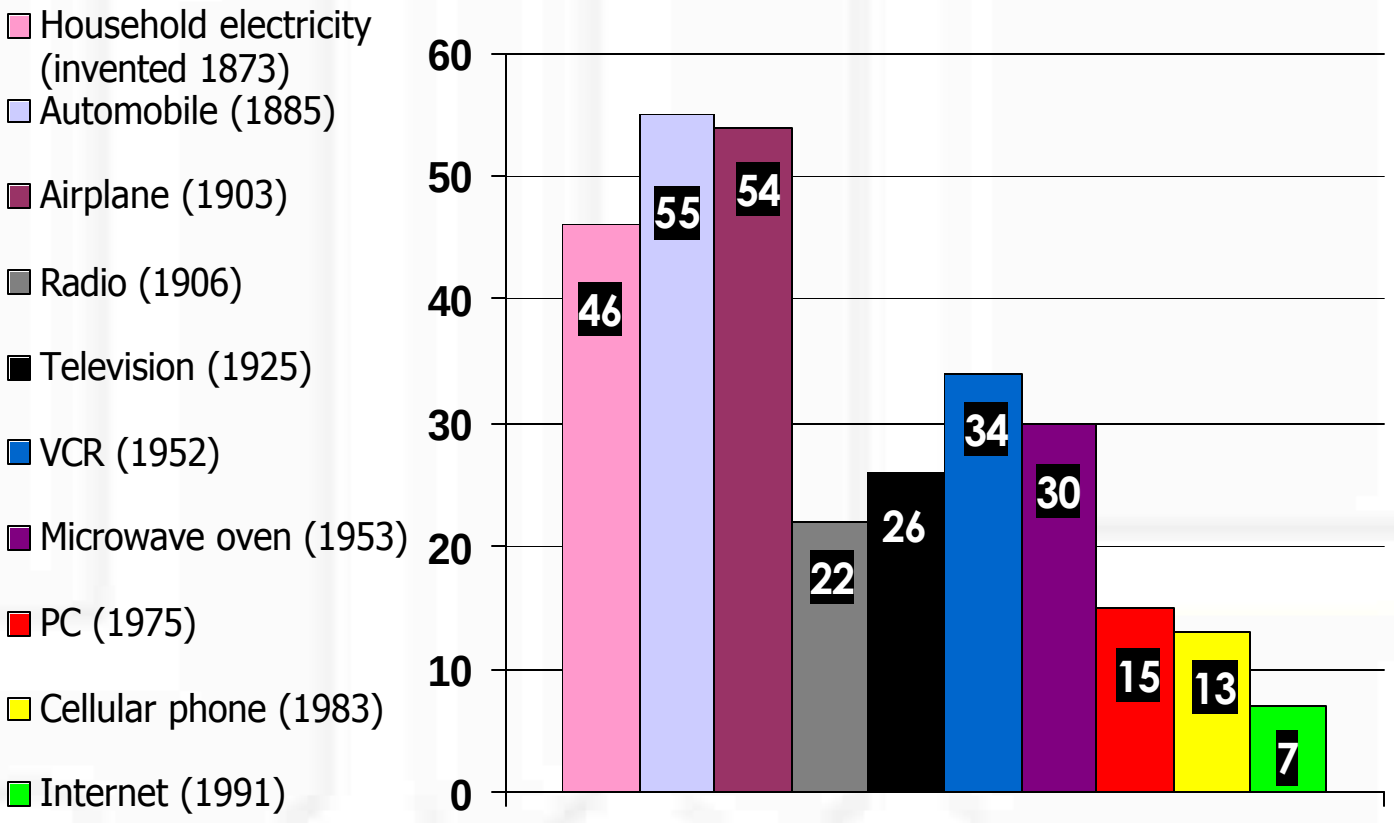


Source: IDC April 2000: Do You Compute?

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Other Technologies: How many years it took to spread to 25% of USA population



Source: Consumer Electronics Manufacturers Assn

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Technology Adoption Lessons

- The rate of adoption of new technologies is accelerating
- The Internet is truly a compelling technology
- It took only seven years...

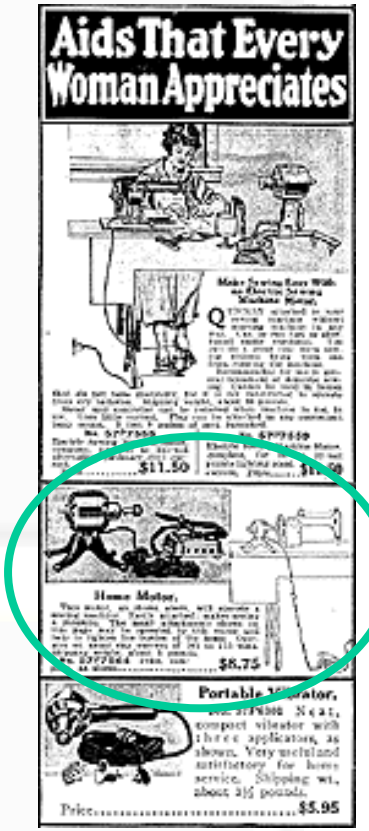
even with a complex access device hidden in out-of-the-way locations!

Electricity as the Killer App: postcard from 1918

Wired Magazine, October 1996

- The year: 1918
- The new technology: household electricity
- The alleged killer product: the "Home Motor"
 - "stand-alone"
 - "many attachments"
 - "variety of applications"

The result: the electric motor both became ubiquitous and yet disappeared



Electricity tTday

- "Typical" 3 bedroom ranch house
 - not including hard-wired devices: 34 outlets
- "Home Motors"
 - White goods/appliances:
 - washer, dryer, dishwasher*, coffee grinder, pasta maker, bread maker, blender, mixer, refrigerator*, oven, vacuum
 - CE:
 - CD changer, PC, VCR, video camera, camera
 - Other:
 - HVAC, toothbrush, toys

>20 embedded "home motors" without stepping into the garage

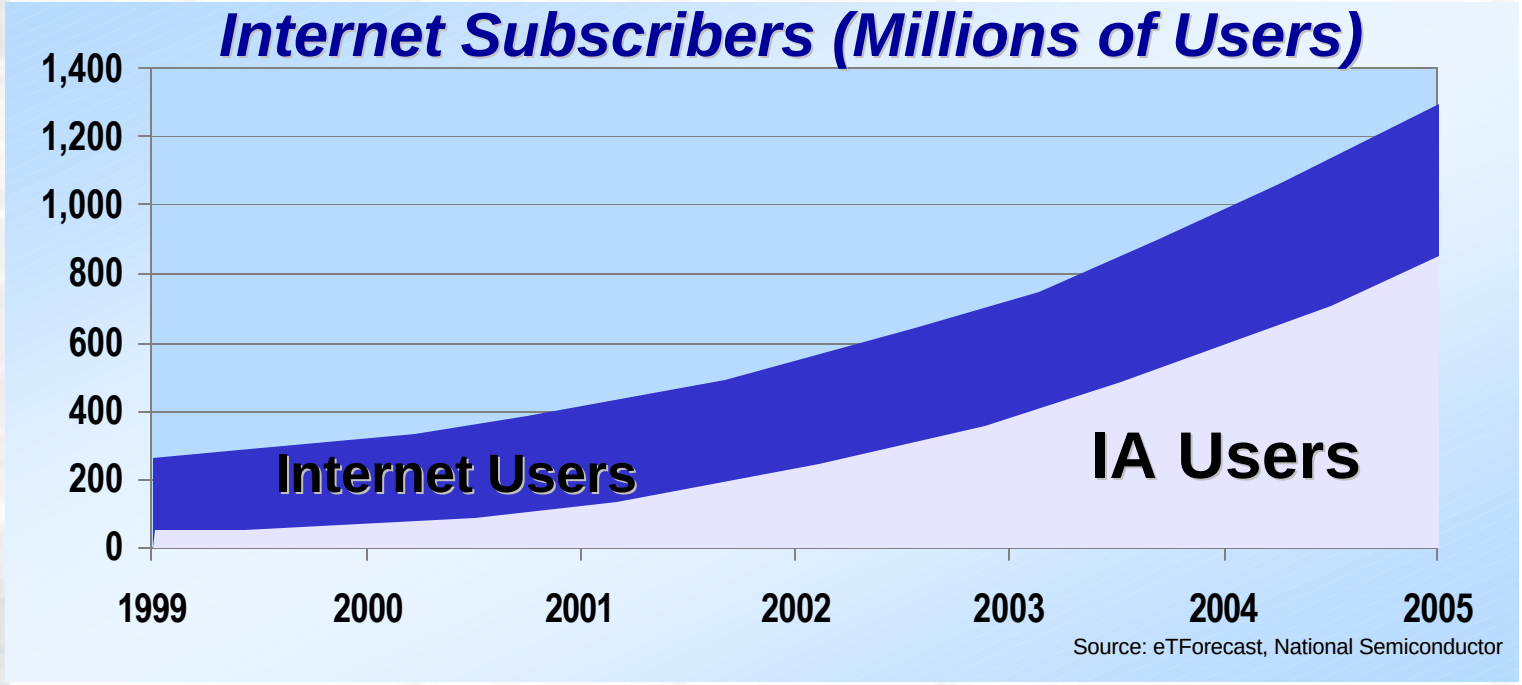
Early Days of the Internet: the personal computer

- The time: now
- The new technology: the Internet
- The “home motor”: the PC
 - The vast majority of internet access today is from a PC
 - This will change

The early days are almost over



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The Internet tomorrow

- By 2003 almost half of all Internet users will access the internet from something other than a PC!
- What form factors will these devices be?

The answer's already partly visible…today!

Today's Internet Appliance Segmentation:
A Tale of Two Markets

IA Target Customer #1:
The non-PC household

- For these consumers…
 - The PC is intimidating
 - They feel like they are being left out of the internet revolution
 - Email & browsing are the focus apps
- The IA value advantage:
 - Ease of use
 - Guided content, integrated experience
 - price

- IA Target Customer #2:
 The PC-savvy family
 - For these consumers…
 - The PC is not convenient
 - The location is not convenient
 - Email and browsing are means to an end
 - The IA value advantage:
 - Instant-on
 - Form factor & user model is context-relevant
 - Interoperability with existing devices

Today's Form Factors

Consumer Access Devices



Displayless



Tethered CRT



Set-Top Box



Tethered



Tablet

Enterprise Thin Clients



Displayless



Integrated



Mobile Thin Client

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Compaq's iPAQ MSN Companion

- Compaq IA-2
 - "simple setup"
 - "no computer experience necessary"
 - "personalized content from MSN"

 Source: Compaq



- ISP subsidy model

eMachine's MSN Companion

- "…the Internet to consumers in a simple and affordable way"
- For use with external monitor
- Small form factor
- ISP subsidy model



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3Com's Ergo™ Audrey™ device

- "Radical simplicity"
- Family "nerve center" user model
 - Internet "channel selector"
 - 3 ways to email
 - appointments and contact management
- Get-on, get-off user model
- No subsidy model

Source: 3Com Oct 2000



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Honeywell's WebPAD™ appliance

First of many web-enabled solutions from Honeywell. They found:

- 81% of their customers want access to Internet at home
 - 61% found it "hard to imagine doing without" Internet access
- Most would find it more useful if they could log on wherever they wanted
 - >50% wanted access in the kitchen
 - >50% wanted access in the garage
- "Technologies in the home continue to converge, allowing the integration, monitoring and controlling of key home functions via the Internet"



Honeywell WebPAD™ Device

Part of Home Control strategy

Source: Honeywell Oct 2000

Sony's eVilla

- Easy-to-use yet powerful
- "Network Entertainment Center"
- Simplicity
 - "Using the Internet through a PC can be a slow and frustrating process even for the most computer-literate consumer"
 - No long boot-up
 - No hassles managing plug-ins
- "We haven't just made it easier, but we've also made it more fun"
- Ultra high-resolution display
- Integrated ISP package



Source: Sony Jan 2001

Enabling Requirements



Set-Top Box



Personal Access Devices



Commercial Thin Client

1. **Optimum "technology solution"**
 - **Balance of 3 "P"s**
 - **Performance, power and price**
 - **Smart integration**
 - **Analog, connectivity and IA technology**
2. **Great "reference designs"**
 - **Fast time to market**
3. **Partner infrastructure support**
 - **Manufacturing**
 - **Software & hardware development**
 - **Channel development**

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The Right Performance

- "Basic" Internet functions
 - HTML
 - Some XML
 - Popular plug ins
 - JAVA
 - Optimize for the pipe!
- Scale for specific performance demands with optimized HW accelerators
- Compatibility to the Internet
 - x86 is critical

Extending Performance

- Core processing on the x86 is NOT the most efficient way to run all applications
- High-end decoding and encoding will ALWAYS be better with “external” on board or on-chip accelerators
- Which do you think is cheaper, lower power, and better performance?
 - PIII600 solution plus HW decode software or
 - Geode™ GX1 solution plus HW decoder

Low Power

- Small native x86 instruction set core
- Small memory footprint
- High integration of peripherals
- Block, frequency, voltage regulation
- Latest process technology

Low Price

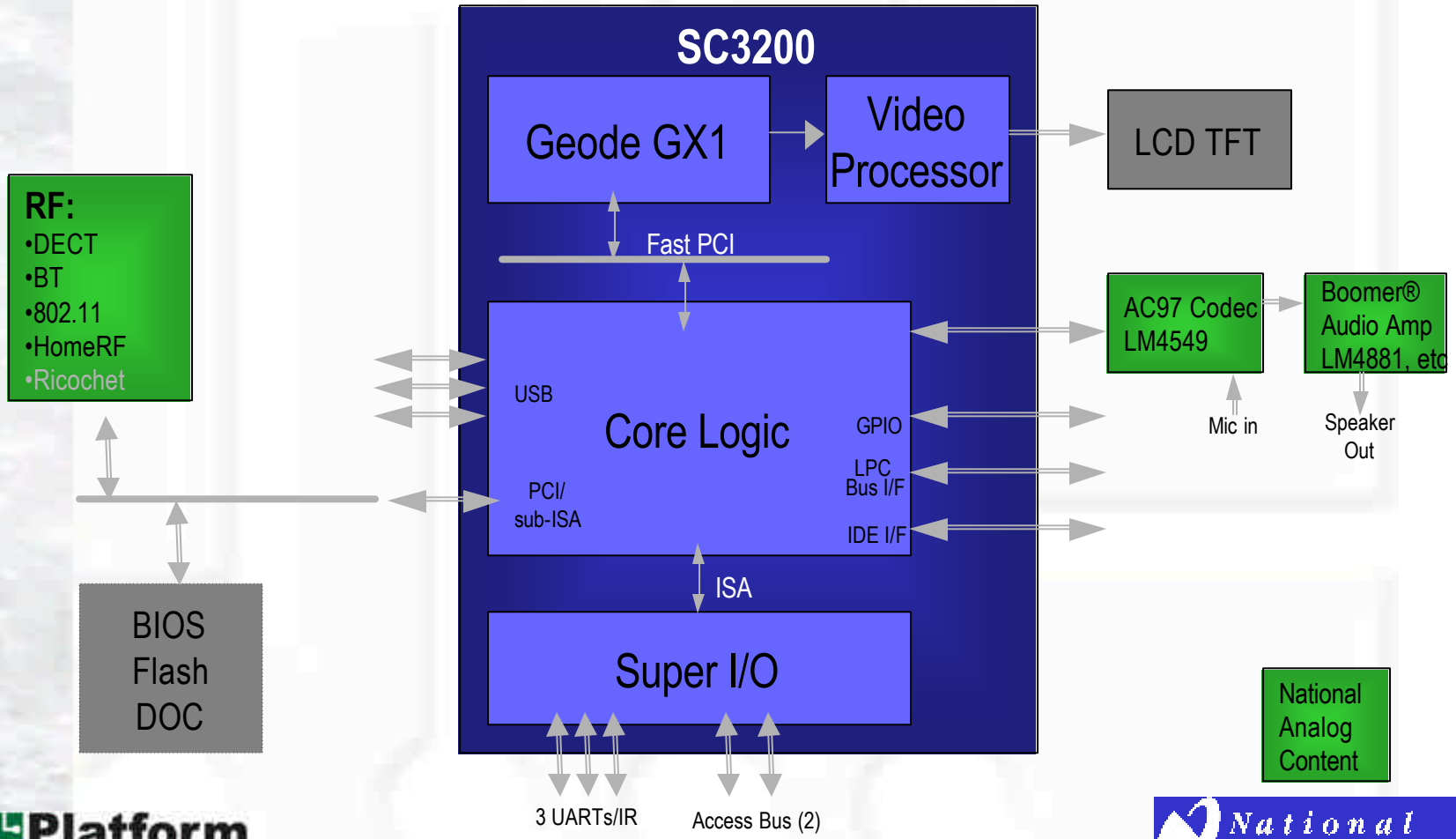
- System level
 - Must minimize Flash/SDRAM memory
- Integration
 - Single-Chip solutions now available
- Manufacturing
 - Latest process technology
 - High yield, high volumes, low package cost, low wafer cost

Processor Summary

- The right performance
 - Keep up with Internet applications and the pipe
 - Add on-board or on-chip HW accelerators for spike requirements
- Integration
 - Great advantages for cost and power
 - Don’t exceed optimum die size or package ball counts
- Reusable blocks
 - Don’t change everything every time
 - Be ready to customize

System-level Silicon Integration

Geode™ SC3200 System Diagram



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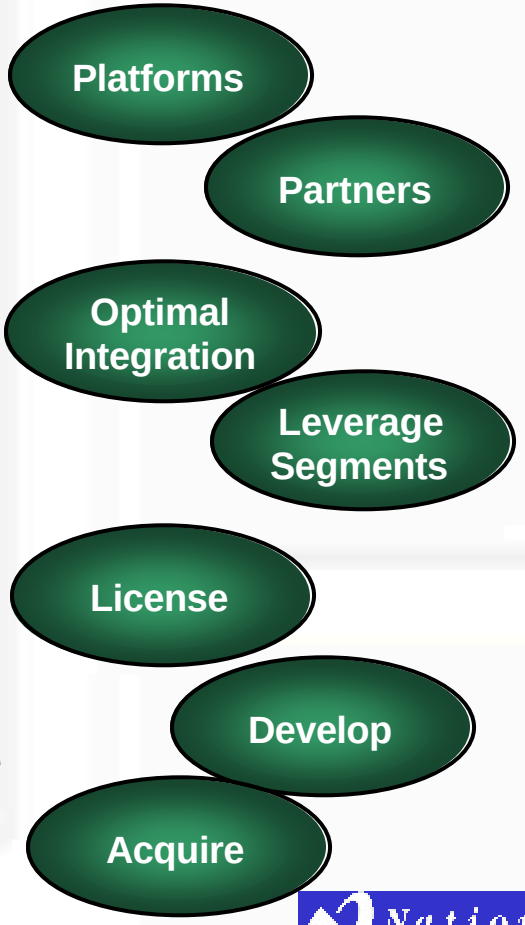
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What's Next: New Technologies

- Further integration
 - 3P - price, performance and power
 - Reusable IP - broad customization
 - PIA - Personal Information Agent
- Wireless everything

Technology Provider's Value Proposition

- Time to Market
 - Total System Solution
 - Best Target System Expertise & Service
 - Key Strategic Partnerships
- Optimized System Cost
 - Integration Roadmap
 - Cross Platform Portability/Leverage
- Right Technology @ Right Time
 - Security
 - Biometrics
 - End User Experience
 - Audio, Video & Graphics
 - Hand Writing Recognition, Security, Voice
 - Communications
 - Wireless & Wire-Line



Building an Information Appliance
Infrastructure

- Geode™ Customers
 - 3Com
 - Boundless
 - Compaq
 - Dell
 - Ericsson
 - GE
 - Honeywell
 - IBM
 - Legend
 - Philips
 - Sony
 - Vestel
 - Wyse
- Channel Partners:
 - AOL
 - Microsoft (MSN)
 - Cable Cos
 - Education Ind.
 - Grocery Ind.
 - Financial Ind.
 - Satellite Service Cos
 - Telephone Cos
- ODM Customers:
 - Acer
 - Allwell
 - Arima
 - Celestica
 - Delta
 - DT Research
 - Proview
 - FIC
 - Informtech
 - Quanta
 - RSC
 - Samsung
 - Takaoka
 - Tatung
- Technology Partners:
 - BeIA
 - bSquare
 - Citrix
 - CIC
 - Dr. Design
 - Inprimis
 - Liberate Technologies
 - Lineo
 - **Merinta**
 - Metricom
 - Microsoft
 - **QNX**
 - Tuxia
 - Wind River
 - Xirlink

and many more...

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The Market is Here!

- The Internet market is waiting for no one
- Great products are now beginning to enter the market
 - Sony eVilla, 3COM Audrey, Compaq iPAQ, Philips AOLTV, Honeywell WebPAD™ device, and many more in the works
- Information appliances will connect hundreds of millions to the Internet
- Devices, services and content will cause the market to accelerate


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Just one more thing...

- The most highly integrated, optimized, high performance, low cost hardware solution will fail miserably if the software is weak
 - Time to market
 - Cross-platform leverage
 - Developers environment
 - Remote update and hosting capabilities
 - Compatibility
 - OEM brain-suck

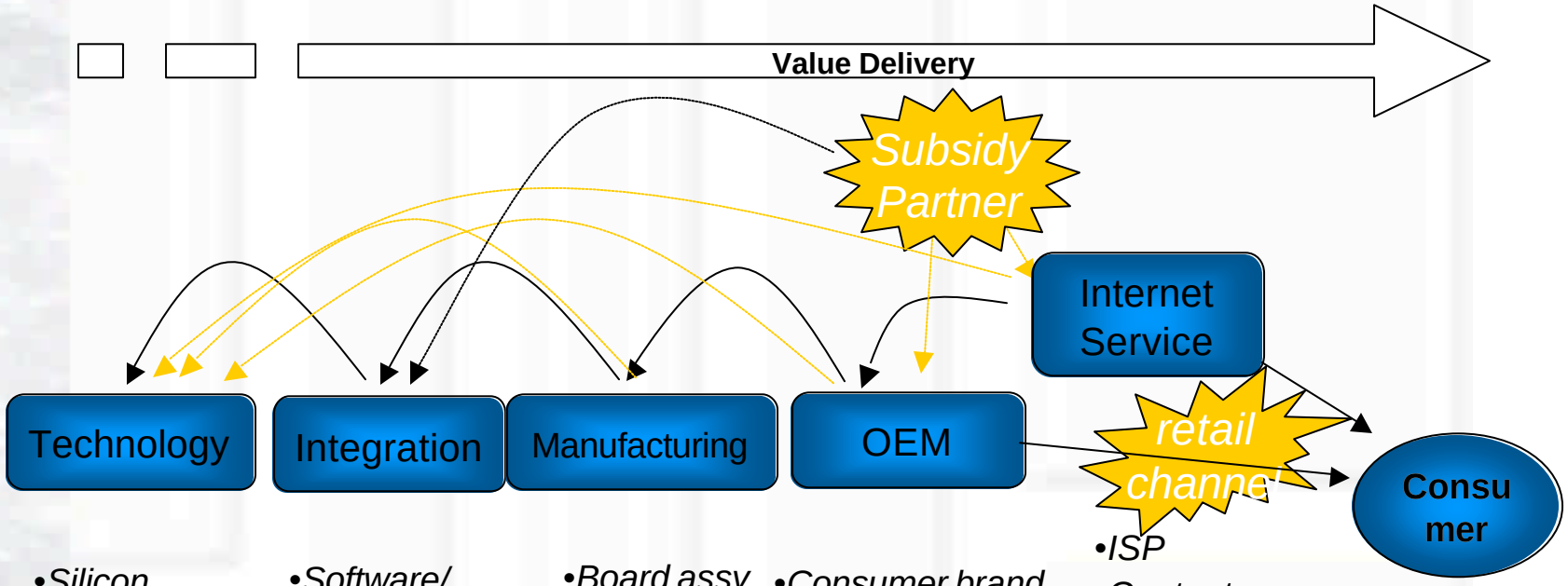
QNX Software Systems

David Dickey
Applications Engineer
QNX Software Systems, Inc.



San Jose January 23-24, 2001 • Taipei February 14-15, 2001

Simplified IA market chain



- *Silicon*
- *Display*
- *BIOS, OS*
- *Design*

- *Software/ hardware integration*

- *Board assy*
- *logisitics*
- *Returns/ fulfillment*
- *Warranty Service*

- *Consumer brand*
- *Device Specification*
- *retail channel*

- *ISP*
- *Content*
- *Subsidy*
- *Branding*

Market Chain Learnings

- Business models are formative
- Business models are complex
- Uncertainty in market chain breeds opportunity for new players
- Window is finite

Merinta

Scott Maysonave
Marketing Director
Merinta, Inc.



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